The Journal of Accounting and Management

The Implementation Impact of IFRS 16: *Leases* on JSE Listed Technology and Telecommunication Companies Using a Constructive Capitalisation Model

Carley Cumming[1], Harold Galt[2]

Abstract: Objectives: This study used a constructive capitalisation model to assess the likely impact IFRS 16 will have on a company's financial statements and ratios when it is implemented; this article analysed this expected impact on the financial position, financial performance and market ratios for technology and telecommunication companies. **Prior work:** This study builds on prior lease accounting research. **Approach:** A two sample (paired) t-test was used to test the magnitude of the change that occurred in the financial statement ratios after applying the constructive capitalisation model. The two samples consisted of the financial ratios before operating leases were capitalised, compared to the financial ratios post-capitalisation for JSE listed technology and telecommunication companies. **Results:** The analysis of the data revealed that when the constructive capitalisation model is applied it results in changes in the financial position, financial performance and market ratios for both the technology and telecommunication populations. Despite a number of these changes being significant for the technology population, the changes for the telecommunication population were not considered significant. **Implications:** Those companies that have material operating leases should assess what impact IFRS 16 will have on their financial statements and financial ratios before the new lease standard IFRS 16 comes into effect. **Value:** For entities that have a significant number of operating leases, IFRS 16 is anticipated to materially affect the figures in the financial statements, capital structure, as well as liquidity and profitability ratios. Numerous stakeholders rely on these reported figures and ratios when making entity-related decisions.

Keywords: constructive capitalisation; finance leases; IFRS 16; off-balance sheet financing; operating leases

JEL Classification: M41

1. Introduction

Globally, and in South Africa, leasing forms part of a substantial source of financing for companies. The 2016 global leasing report by the White Clarke Group, ranked North America first as the world's largest leasing region for consecutive years. North America accounts for 39% of the world's leasing market volume. South Africa was placed 24th of the top 50 countries, with $4.6 billion, which shows the lease volume reached in 2016 (White, 2016).

[1] Lecturer, University of KwaZulu Natal, School of Accounting, Economics and Finance, South Africa, Address: Varsity Drive, Westville, South Africa, Tel.: +27 31 260 7433, Corresponding author: cummingc@ukzn.ac.za.
Senior Lecturer, University of Johannesburg, School of Accounting, South Africa, Address: Robert Sobukwe Building, Soweto Campus, South Africa, Tel.: +27 011 559 4555, Corresponding author: carleyc@uj.ac.za.
[2] Senior Lecturer, University of KwaZulu Natal, School of Accounting, Economics and Finance, South Africa, Address: Varsity Drive, Westville, South Africa, Tel.: +27 31 260 2651, E-mail: galt@ukzn.ac.za.

On 13th January 2016, the International Accounting Standards Board issued the new lease standard, IFRS 16. The hotly debated and long anticipated IFRS 16 has become effective for all financial periods commencing on or after the 1st January 2019 (IASB, 2016c; De Oliveira, 2016; Stainbank, Oakes & Razak, 2016). It is expected to have a far-reaching effect on companies both globally and in South Africa. For entities that have a significant number of operating leases, IFRS 16 is anticipated to materially change certain numbers in the financial reports, which, in turn, will impact the capital structure, liquidity and profitability. Numerous stakeholders including investors and lenders depend on these reported figures and ratios to make entity-related decisions (Dillion, 2014; IASB, 2013; Ernst & Young, 2016).

IFRS 16 is the outcome of a plan by the IASB and the Financial Accounting Standards Board (FASB) to enhance the accounting for leases in response to concerns over the deficiency in transparency of information about lease obligations. The old lease standard, the International Accounting Standard 17: *Leases* (IAS 17), has been used in the past by entities to accomplish 'off-balance sheet' financing by a lessee, whereby the lessee can obtain the use of an asset and have an obligation for lease payments to the lessor; however, it is permitted under IAS 17 to not reflect the lease assets and liabilities in their financial statements (IASB, 2016a). The Securities and Exchange Commission (SEC) calculated that the United States had $1.25 trillion in off-balance sheet financing resulting from operating leases in 2005 (SEC, 2005). Therefore, companies that reported material off-balance sheet leases under IAS 17 will now be forced under IFRS 16 to capitalise a lease asset based on the present value of the lease payments and will recognise a financial liability if lease payments are made over time (Koppeschaar, Rossouw, Sturdy, Van Wyk, Gaie-Booysen, Papageorgiou, Smith, Van der Merwe & Schmulian, 2016).

Under IAS 17, a lease was either categorised as an operating or finance lease for the lessee; however, IFRS 16 sets forth a single lessee accounting model that reveals that such leases should be capitalised, as they result in an entity obtaining a right of use asset and a corresponding lease liability when the lease begins (Koppeschaar *et al*., 2016). The lessee's financial statements and ratios are expected to materially change when the single lease accounting model under IFRS 16 is applied. This study investigated the anticipated change in financial statements and ratios that will result from the requirements of IFRS 16. The objective of the study was to determine the impact of implementing IFRS 16 on the financial position, financial performance and market ratios of JSE listed companies when a constructive capitalisation model is used.

2. Certain Deficiencies in IAS 17 Have Necessitated a New Lease Standard

In the past when a company required the use of an asset for its operations, it had to decide how to finance this asset, either through buying the asset or entering into a lease agreement (Correia, Flynn, Uliana & Womald, 2011; Stainbank *et al*., 2012). Evidence from a study carried out by Durocher (2008) on companies in the United States and Canada, shows that in the past entities have chosen to structure their lease agreements to bring about off-balance sheet financing by means of a lessee not having to record lease assets and liabilities in their statement of financial position, therefore resulting in an understatement in their debt balance and their employed assets They preferred this treatment, as it was perceived to prevent companies from breaching their loan covenants and improves incentive compensation (Jesswein, 2009). The lessee could accomplish this by arranging the lease agreement so that it is classified as an operating lease and treated as a rental agreement, which resulted in rent

expense being recorded in the statement of comprehensive income – with no corresponding effect on the statement of financial position. This situation was, however, inclined to infringe on the comparability of the financial statements of different companies. With this off-balance sheet finance, the company may have looked more favourable to various stakeholders, who then used this information, among other things, to assess credit applications and make investment decisions (Stainbank *et al*., 2012).

In accordance with the qualitative characteristic of "faithful representation" as set out in the conceptual framework and the asset and liability definition, certain leases, in terms of IAS 17, were capitalised, which resulted in a leased asset and corresponding liability being recognised in the statement of financial position by the lessee. The concept of substance over form resulted in the reality (substance) of the lease agreement being applied over the legal position (legal form). The lessee was seen as the beneficial owner, despite the fact that they would never own the asset legally. The lessee will therefore record the asset and the corresponding finance as being effectively owned during the period covered by the lease (Stainbank *et al*., 2012).

As per IAS 17, a finance lease "is a lease that transfers substantially all the risks and rewards incidental to ownership of an asset" (IASB, 2010, p. 1). Such leases must be capitalised by the lessee. The standard contains eight examples of situations that will result in the lease being classified as a finance lease. A lessee shall record an expense in the statement of comprehensive income on a straight-line basis for operating leases, which the standard defines as those leases that are not finance leases, with no lease asset and liability being raised in the statement of financial position (IASB, 2010).

It has been debated for more than a decade that the rights and obligations formed by a lease agreement are being capitalised under finance leases, therefore operating leases should be treated in the same way (Duke & Hsieh, 2006; Tai, 2013). It can be argued that a non-cancellable operating lease results in the asset definition being met; however, IAS 17 prevents such assets from being capitalised (for operating leases) in the company's statement of financial position. This then results in the company achieving off-balance sheet financing, as it has the continued use of the operating lease which is non-cancellable without having to recognise an asset and liability in its statement of financial position. To address this deficiency the IASB has issued a new lease standard, IFRS 16, which companies were compelled to apply from 1st January 2019 (Correia *et al*., 2011).

Lessor accounting under IAS 17 remains substantially the same under IFRS 16, where the lessor will continue to classify its leases as either operating or finance leases. However, lessee accounting will change considerably under IFRS 16 (Service, 2018; Stainbank *et al*., 2016). The company that obtains the right to use an asset over a certain time frame in exchange for consideration is known as the lessee. The lessee who is not legally the owner is not required to take possession of the asset leased when the lease agreement comes to an end. In this context the substance is that the lessee obtains the right of use asset that will result in economic benefits over the lease term. As a result under IFRS 16, the lessee will recognise both the right of use asset and a lease liability on its statement of financial position for all leased assets (Koppeschaar *et al*., 2016). According to the (Ernst & Young) Summary of IFRS 16 and its effects, this "gross-up" of the statement of financial position is expected to result in the debt ratios and return on assets ratio (ROA) deteriorating. Companies will have to assess what impact this will have on compensation measures such as employee bonuses and debt agreements. Companies may also need to renegotiate debt covenants with loan providers to allow more leeway in meeting these covenants (Ernst & Young, 2016).

3. Literature Review

Imhoff, Lipe and Wright (1991) conducted a study into a total of 14 companies covering seven different industries to assess what impact the Imhoff, Lipe and Wright method would have on operating leases. The industries included in the study consisted of "home furnishings, food stores, fast food, semi-fast food, clothing, drug/food stores and airlines" (pp. 60–62). These sectors were chosen, as they made use of a material number of operating leases that had long lease periods. The companies from the industries tested were those with a large proportion of future minimum lease payments in relation to total assets and a company that was comparable in size that had a significantly lower proportion. The findings showed that when the operating leases were brought onto the balance sheet, the debt/equity ratio increased by a mean 191% for high leases and 47% for low leases. In addition, the ROA ratio decreased by a mean of 34% for high leases and 10% for low leases. The companies operating in the home furnishings industry showed the biggest change in both the ROA ratio and the debt/equity ratio. In the study, the assumption was made that the income statement adjustments were nil. This assumption was later relaxed when the impact on income from constructive capitalisation was investigated by Imhoff *et al*. in their 1997 article. The findings showed that when operating leases were capitalised for four different companies in the United States and the income statement impact was assessed, there was a change in the ROA ratio and the return on equity (ROE) ratio (Imhoff *et al*., 1997).

Beattie, Edwards and Goodacre (1998) arbitrarily chose 232 commercial and industrial listed entities in the United Kingdom to determine the impact on key ratios when operating leases are capitalised using the Imhoff, Lipe and Wright method. They discovered that it was more accurate to incorporate entity-specific assumptions for such things as the residual life of the lease as well as the rate of tax and subsequently adjusted the Imhoff, Lipe and Wright method with these assumptions. Findings from their study showed that once operating leases were capitalised, it resulted in material changes to the profit margins in addition to the ROA ratio and deterioration in gearing ratios. In addition, it was found that, on average, the unrecorded long-term liability calculated consisted of 39% of the long-term debt reported by the company in comparison to the estimated unrecorded asset, which consisted of 6% of the reported total assets. The results revealed that the services industry showed the most significant changes in ratios when an analysis was performed between pre- and post-capitalisation ratios (Beattie *et al*., 1998).

Bennett and Bradbury (2003) conducted a study on 38 companies that were listed on the New Zealand stock exchange. When the operating leases were capitalised, the results showed the total liabilities increased on average by 22.9%, assets increased by 8.8% and equity decreased by 3%. The operating lease capitalisation caused the leverage ratio to go from 0.469 pre-capitalisation to 0.519 post-capitalisation. The ROA ratio decreased from 12.6% to 11.5% and the current ratio fell from 2.11 to 1.81.

A study performed by Fulbier, Silva and Pferdehirt (2008) applied the Imhoff, Lipe and Wright constructive capitalisation method, but added modifications for such things as the company-specific discount and tax rate, among others. Ratios indicating the structural change, profitability and market perception were performed for 90 German companies that were selected for testing. The simulated results showed that when operating leases were capitalised, the median debt equity ratio increased from 185% to 210%. In contrast, other ratios such as earnings before interest and tax (EBIT) and net income (NI) showed changes that were not significant. In addition, the market ratios were only marginally impacted with the earnings per share (EPS) and price earnings (PE) ratio remaining stable.

The findings also showed that the industries mostly impacted by the lease capitalisation were companies operating in the retail and fashion industry, which further confirmed that certain industries make more use of operating leases than others (Fulbier *et al*., 2008).

Durocher (2008) sampled 100 companies in Canada, which were considered the largest by revenue based on fiscal information for 2002 and 2003. The ratios assessed were categorised into those that show financial strength, management performance and investment return. The outcome of the study showed that when operating leases were capitalised, it caused a significant amount of additional assets and liabilities to be recorded, which would exceed the materiality threshold of 10% of income before taxes and 0.5% of net revenues. The impact on the income statement was found to exceed the materiality threshold for not more than 25% of the companies tested. The ROA and ROE ratios were used to evaluate the impact on management performance and were found to only have a statistically significant impact for the merchandising and lodging, oil and gas and financial services industries. The investment return for similar industries showed significant effects.

The prior studies discussed were all based in countries other than South Africa. One study that took place in South Africa was performed by De Villiers and Middleberg in 2013. The sample was selected based on the market capitalisation in 2010, which resulted in 40 companies from the JSE being selected for testing. Companies were excluded from the sample if they did not have adequate disclosure of operating leases in their financial statements. Ratios that gave insight about the financial risk of the companies in the sample, including the debt ratio, debt/equity ratio and interest cover ratio, were tested. The debt ratio showed an increase of 8%, the debt/equity ratio revealed an increase of 9% and the interest cover ratio declined by 8% on average. The analysis of the profitability ratios revealed that the net profit % ratio fell by 32% on average, the ROE declined on average by 21%, whilst the ROA ratio reflected a decrease of 20%. The earnings per share and price earnings ratio were used to assess if there was any change in market perspective before and after operating leases were capitalised. The earning per share ratio was impacted negatively and showed a decline after the operating leases were capitalised. The study further showed that the price earnings ratio on average was calculated as 26% pre-capitalisation which increased to 33% post-capitalisation.

Dillion (2014) conducted a study on JSE listed companies operating in the "general industrials; industrial transportation; food and drug retailers, general retailers and travel and leisure" industries (p. 38). A constructive capitalisation method was applied and the financial ratios calculated and compared for both pre- and post-capitalisation. The leverage ratios as a whole showed the most significant changes, namely the debt equity ratio, which was calculated using book values that on average increased by 74.7 % and the times interest earned ratio dropped from 111.2 times to eight times. In addition, debt on average increased by 33.7% while the median increase was 18.1% when operating leases were constructively capitalised. Total assets showed an average and median increase of 11.3% and 8.1%, respectively, when unrecorded lease assets were raised. The companies included in the sample showed that the impact on net profit varied from company to company with a number of companies experiencing a decrease in net profit after tax by as much as 44.6% and others experiencing as much as a 21.6% growth. Other entities in the sample showed a smaller impact on net profit, ranging from -4.6% to 4.3%. It was concluded that the financial ratios related to the balance sheet showed a greater change than the ratios that were related to the income statement. When analysing the five different sectors tested, the results showed the food and drug retailers and general retailors' ratios were impacted the most when the capitalisation of operating leases occurred. In contrast, companies

operating within general industrials were found to be the least impacted by the operating leases being capitalised.

The different methods for capitalising operating leases have developed over the last decade with the most recent model being that developed and used by Dillion in 2014. The constructive capitalisation model that was applied to the JSE listed companies in this study is outlined and explained in the section below.

4. Research Methodology

The study used information from JSE listed companies' annual financial statements which were then entered into a constructive capitalisation model to determine the proposed impact that implementing IFRS 16 will have on a company's financial statements and financial ratios.

The population comprised all JSE listed entities as at 29th September 2018 per sharenet (Sharenet, 2018). The sampling technique applied was a process of elimination, using the following elimination criteria: entities operating in industries that have been included in prior studies were eliminated, as their results would not contribute to literature; entities in the financial services sector were eliminated due to the nature of operations and unique reporting requirements; also excluded were entities included in industries that do not have material operating leases and therefore would not be materially impacted by IFRS 16. Once the process of elimination was performed, the technology and telecommunications industry of the JSE main board remained (PricewaterhouseCoopers (PWC), 2018; PWC, 2016). All the JSE listed entities in the technology and telecommunications industry listed on the main board were chosen to be tested and included in the population. On the 29th September 2018 there was a total of 21 entities in the technology and telecommunication industry that were registered on the JSE main board. This can be further broken down into 13 companies in the technology industry and six companies in the telecommunication industry.

The steps in the constructive capitalisation model were applied for each company included in the population. This model used in the study is the same as that applied by Dillion to assess the proposed impact the new lease standard would have on companies operating in five different sectors of the JSE. Dillion (2014) developed this model by integrating aspects of previous capitalisation models used by founding researchers such at Imhoff *et al*. The steps in the model were set up in Microsoft Excel to ensure the model's accuracy. The constructive capitalisation model comprised eight steps that, when applied, provided an indication of what the proposed impact would be on a company's financial statements and financial ratios when IFRS 16 is applied.

Once the model had been applied to each company included in the population, the data were evaluated to ensure that the objectives of this study were met. A two sample (paired) t-test was used to test the magnitude of the change that occurred in the financial statement ratios after applying the constructive capitalisation model. The two samples consisted of the financial ratios before operating leases were capitalised, compared to the financial ratios post-capitalisation. The mean ratios pre-capitalisation and post-capitalisation were summarised in tables to facilitate the analysis.

5. Results

Tables 1 to 6 show the impact on the financial position, financial performance and market ratios on JSE listed technology and telecommunication companies when operating leases are capitalised using a constructive capitalisation model. The absolute and relative changes from the paired, two tailed test that resulted from capitalising operating leases was considered to be statistically significant using the following symbols: (a) significant at the 1% level, (b) significant at the 5% level, (c) significant at the 10% level. If no symbol appears, then the figure is not statistically significant at any of the three significance levels used.

5.1. Financial Position

5.1.1. Technology Companies

When the constructive capitalisation model was applied to the population of technology companies listed on the JSE, all the financial position ratios changed. Once the paired, two tailed t-test was applied to the population of JSE listed technology companies it was possible to determine the statistical significance of each change.

The debt ratio experienced a mean absolute increase of 1.43% and a mean relative increase of 4.16% after operating leases were constructively capitalised. These changes were found to be significant at the 5% level.

When the debt/equity ratio was calculated using book values, the ratio increased from 128.12% pre-capitalisation to 135.39% post-capitalisation. The increase in the debt/equity ratio, determined using book values, caused a mean absolute increase of 7.27% which translated to a 7.94% relative increase. The absolute and relative changes that resulted from capitalising operating leases were discovered to be significant at the 1% significance level for the debt/equity ratio. Additionally, the change in the debt/equity ratio was then calculated using market values instead of book values. The mean relative change that resulted was 7.07%, post-capitalisation of operating leases, which was slightly lower than the mean relative change of 7.27% which resulted when book values were used. The mean absolute change in the debt/equity ratio, determined using market values, was calculated to be 2.5%, and under the t-test these changes were discovered to be significant at the 1% level. The current ratio deteriorated marginally from 83.07 to 82.53 for the technology companies in the population. This mean absolute decrease of 0.55 translated into a 4% mean relative decrease when the constructive capitalisation model was applied. This change was not found to be significant at the three different significance levels used in this study.

Table 1. The Impact on the Financial Position of JSE Listed Technology Companies when Operating Leases are Constructively Capitalised

Financial position ratios	Pre-capitalisation mean	Post-capitalisation mean	Mean absolute change	Mean relative change	P-Value (T-test)	Spearman's rank correlation coefficient
Debt ratio	45.50%	46.94%	1.43% [(b)]	4.16% [(b)]	0.015	1
Debt/Equity (Book value)	128.12%	135.39%	7.27% [(a)]	7.94% [(a)]	0.007	1
Debt/Equity (Market value)	45.71%	48.56%	2.5% [(a)]	7.07% [(a)]	0.007	0.983
Current ratio	83.07	82.53	-0.55	-4%	0.284	0.998

The Spearman's rank correlation coefficient shows that the ranking of companies did not change materially when the constructive capitalisation model was applied. The ranking for both the debt ratio and the debt/equity ratio calculated using book values is 1, which shows there is strong positive correlation in the ratios, pre-capitalisation and post-capitalisation. Furthermore, the debt/equity ratio, determined using market values and the current ratio, shows a similar relationship despite being slightly below 1.

5.1.2. Telecommunication Companies

When the constructive capitalisation model was employed to capitalise operating leases for the population of JSE listed telecommunication entities, it also resulted in increases in the three debt ratios, as demonstrated in Table 2.

Post-capitalisation, the debt ratio showed a mean absolute increase of 4.51% and a mean relative increase of 18.78%. The debt/equity ratio that was calculated using book values went from 57.38% to 76.57% due to the operating leases being capitalised. The mean absolute increase experienced by the population of telecommunication companies was 19.19% and the mean relative increase was 30.67% for the book value debt/equity ratio. Similarly, an increase in the debt/equity ratio computed using market values shows an increase of 22.98% and 5.91%, relating to the mean absolute change and mean relative change respectively. The current ratio experienced a mean deterioration from 1.76 to 1.61 after operating leases were capitalised. This represents a slight mean absolute decrease of -0.15 and a mean relative decline of 9.45%.

Despite these changes in the financial position ratios experienced for the telecommunication companies under study, not one of these changes was statistically significant when comparing the p-values calculated to each significance level.

The Spearman's rank correlation coefficient was 1 for all of the ratios calculated, which showed an extremely strong positive correlation between the ranking in the pre-capitalisation ratios and those that were calculated post-capitalisation.

Table 2. The Impact on the Financial Position of JSE Listed Telecommunication Companies when Operating Leases are Constructively Capitalised

Financial position ratios	Pre-capitalisation mean	Post-capitalisation mean	Mean absolute change	Mean relative change	P-Value (T-test)	Spearman's rank correlation coefficient
Debt ratio	29.60%	34.11%	4.51%	18.78%	0.134	1
Debt/Equity (Book value)	57.38%	76.57%	19.19%	30.67%	0.255	1
Debt/Equity (Market value)	22.98%	28.90%	5.91%	26.03%	0.155	1
Current ratio	1.76	1.61	-0.15	-9.45%	0.319	1

The results obtained by De Villiers and Middleberg (2013) demonstrated that when operating leases in the authors' sample were capitalised, the debt ratio and debt/equity ratio both increased by 9% and 8% respectively, having the companies appear to be more risky once their operating leases were capitalised on the statement of financial position. When Dillion (2014) capitalised operating leases in a sample of 48 JSE listed companies, all their debt ratios calculated increased, which was consistent with the results from De Villiers (2013) and from this study. An increase in the debt ratios and debt/equity ratios was expected due to the increase in liabilities that occurs as a result of the capitalisation of operating leases onto the statement of financial position. The changes in the debt ratio and debt/equity ratio based on market values calculated by Dillion (2014) were significant at the 1% level, whilst the mean change in the debt ratios for the telecommunication companies in this study were not considered significant at any of the significance levels. It was assumed that the changes in the debt ratios were not significant due to telecommunication companies having been warned in advance of IFRS 16 being effective for the financial periods beginning on or after 1st January 2019 and having arranged their leases to avoid substantial increases in their debt once IFRS 16 was applied. Dillion (2014) experienced a change in the current ratio calculated pre-capitalisation and post-capitalisation, which revealed a mean absolute deterioration of 0.25 that resulted in a mean relative decline of 10.6%, significant at 1%. A similar decrease was experienced in the current ratio by the technology and telecommunication companies, which can be attributed to the current portion of the lease liability being capitalised under the constructive capitalisation model.

5.2. Financial Performance

The profitability ratios all changed post-capitalisation for each technology and telecommunication company in the population, as shown in Tables 3 and 4.

5.2.1. Technology Companies

From the EBITDA and EBIT margins, both of these ratios improved marginally by the mean absolute increase of 0.84% and 0.18% respectively. This mean absolute increase was accompanied by an increase in the mean relative change in the EBITDA margin of 3.43% and EBIT margin of 6.27%.

Once the constructive capitalisation model had been applied, the net profit margin, after tax, revealed a marginal mean absolute decrease of -0.04% and a mean relative deterioration of -0.91%. The reason for the decrease in the net profit margin is the additional interest expense on the finance lease liability

that was recognised after treating the operating leases as finance leases. The ROA, in addition to the return on capital employed (ROCE), showed an improvement after the operating leases had been capitalised, as can be seen by the mean absolute change of 0.99% and 2.48% respectively. The mean relative deterioration in the ROA as well as the deterioration in the ROCE for the technology companies was 17.18% and 17.33%, respectively, after the constructive capitalisation model had been applied. In addition, the ROE ratio showed a mean absolute and mean relative increase of 0.03% and 0.14% respectively. Conversely, the asset turnover ratio showed a mean relative decrease post-capitalisation for the asset turnover ratio of 2.34% and a mean absolute decrease of 0.03%. The times interest earned ratio deteriorated by a mean absolute decrease of 24.15. Additionally, the mean relative decrease experienced was a marginal 0.01%. The change in the EBITDA margin, ROA and asset turnover ratio was found to be significant at the 5% level, whilst the ROCE was considered to be significant at the 10% level. The remaining ratios were not found to be significant at any of the significance levels used in this study. A strong relationship was found between the rankings in the ratios pre-capitalisation and post-capitalisation as shown by the Spearman's rank.

Table 3. The Impact on the Financial Performance of JSE Listed Technology Companies when Operating Leases are Constructively Capitalised

Financial performance ratios	Pre-capitalisation mean	Post-capitalisation mean	Mean absolute change	Mean relative change	P-Value (T-test)	Spearman's rank correlation coefficient
EBITDA margin	21.95%	22.79%	0.84%[(b)]	3.43%[(b)]	0.024	1
EBIT margin	17.08%	17.26%	0.18%	6.27%	0.302	0.983
NPAT	14.45%	14.41%	-0.04%	-0.91%	0.655	1
ROA	8.34%	9.32%	0.99%[(b)]	17.18%[(b)]	0.019	0.967
ROCE	14.05%	16.52%	2.48%[(c)]	17.33%[(c)]	0.050	1
ROE	15.53%	15.56%	0.03%	0.14%	0.842	1
Asset turnover	1.17	1.14	-0.03[(b)]	-2.34%[(b)]	0.003	1
Times interest earned	52.39	16.53	-24.15	-0.01%	0.240	0.950

5.2.2. Telecommunication Companies

The EBITDA margin in Table 4 showed a severe mean absolute increase of 28.63% subsequent to applying the constructive capitalisation model and a mean relative improvement of 79.23%. In contrast, the mean increase in the EBIT margin following the constructive capitalisation of operating leases was markedly lower at 0.99% in absolute terms and 1.67% in relative terms. The increase in these two ratios was due to the amortisation on the recognised lease asset being lower than the previously expensed operating lease rental. The net profit margin after tax was 27.74% pre-capitalisation and 28.07% post-capitalisation. The marginal mean absolute increase in this ratio was 0.33%, whilst the mean relative change was calculated to be 20.42%. The next three ratios presented in Table 4, the ROA, ROCE and ROE, improved once the operating leases had been capitalised. The ROCE showed the largest improvement of the three return ratios, as can be seen by the mean absolute increase of 3.05% and mean relative increase of 111.75%. This can be attributed to the sum of amortisation and interest, which could be less than the operating lease rental previously expensed,

indicating that the majority of the leases used by the JSE listed telecommunication companies were in their later years (Dillion, 2014). In contrast, the asset turnover ratio marginally declined post-capitalisation by a mean absolute decrease of 0.08% and a mean relative decrease of 11%. The final ratio that was calculated to assess the change in financial performance post-capitalisation was the times interest earned ratio. This ratio declined from 12.27 times to 8.56 times. This is due to the increase in interest expense that resulted from the lease liability that was brought on the statement of financial position after the constructive capitalisation model was applied and is expressed as a mean absolute decrease of 3.71% and a mean relative decrease 22.92%. It is clear that the telecommunication companies in the population have an increased financial risk due to the increase in debt that resulted from the operating leases being capitalised and treated as if they were finance leases. None of the ratios in Table 4 were considered to be statistically significant when compared to the three different significance levels. All the financial performance ratios displayed a strong correlation in the ranking of the ratios pre-capitalisation and post-capitalisation, except the ratios relating to the ROCE and ROA.

Table 4. The Impact on the Financial Performance of JSE Listed Telecommunication Companies when Operating Leases are Constructively Capitalised

Financial performance ratios	Pre-capitalisation mean	Post-capitalisation mean	Mean absolute change	Mean relative change	P-Value (T-test)	Spearman's rank correlation coefficient
EBITDA margin	69.87%	98.50%	28.63%	79.23%	0.332	1
EBIT margin	44.45%	45.43%	0.99%	1.67%	0.182	1
NPAT	27.74%	28.07%	0.33%	20.42%	0.736	1
ROA	8.82%	11.85%	3.04%	104.76 %	0.354	0.4
ROCE	11.08%	14.13%	3.05%	111.75 %	0.318	0.2
ROE	14.44%	15.82%	1.38%	27.61%	0.326	1
Asset turnover	0.96	0.88	-0.08	-11.00%	0.276	0.8
Times interest earned	12.27	8.56	-3.71	-22.92%	0.205	1

De Villiers and Middleberg (2013) experienced a deterioration in all the profitability ratios calculated once the operating leases had been capitalised for the sample of companies. These differences in the movements in the profitability ratios between the study carried out by De Villiers and Middleberg (2013) and the results in Table 5 and Table 6 were reasonable, bearing in mind that the direction of the change in profit can be different depending on the stage that the lease is in. For example, if a lease is in its early stages the sum of amortisation and interest would be higher when compared to the operating lease rental, which would result in profit decreasing when operating leases are capitalised. In contrast, profit will increase when operating leases are capitalised if the lease is in a later stage, due to the sum of the interest and amortisation being less than the operating lease rental. Dillion (2014) experienced similar movements in the profitability ratios for the sample of 48 JSE listed companies and noted that the changes in the profitability ratios were smaller than the changes that impacted the statement of financial position ratios. Whilst most of the changes in the profitability ratios calculated

by Dillion (2014) were assessed as being significant, in this study only the ROA, ROCE, asset turnover and EBITDA margin for technology companies were found to be significant. This may be due to companies being informed in advance of the implementation of IFRS 16, which would result in companies arranging their leases to avoid huge changes in the profitability ratios once IFRS 16 was implemented. This is a reasonable assumption, given that IFRS 16 will be effective for periods beginning on or after 1st January 2019.

5.3. Market Ratios

When market ratios were calculated and compared, both before and after applying the constructive capitalisation model, certain changes were noticed. These changes can be fragmented into those that apply for the population of JSE listed technology companies, as shown in Table 5, and those relating to the JSE listed telecommunication companies which are shown in Table 6.

Table 5. The Impact on Market Ratios of JSE Listed Technology Companies when Operating Leases are Constructively Capitalised

Financial performance ratios	Pre-capitalisation mean	Post-capitalisation mean	Mean absolute change	Mean relative change	P-Value (T-test)	Spearman's rank correlation coefficient
Earnings yield	9.11%	9.07%	-0.04%	-0.91%	0.549	1
Price earnings	43.65	44.04	0.39	0.99%	0.198	0.983
Market to book ratio	11.88(c)	11.91(c)	0.03	0.82%	0.063	1

5.3.1. Technology Companies

The earnings yield deteriorated marginally from 9.11% to 9.07% after the operating leases were capitalised by applying the constructive capitalisation model. A mean absolute decrease of 0.04 was reported for the earnings yield ratio. In contrast, a mean absolute improvement was calculated for the price earnings (PE) ratio of 0.39, which equated to a mean relative change of 0.99%. Both these changes in the earnings yield and PE ratio were due to the earnings per share decreasing post-capitalisation. The market-to-book ratio showed a minor increase of 0.03 and a marginal mean relative increase of 0.82%, after applying the constructive capitalisation model. This increase is due to the book value of equity decreasing post-capitalisation, which, in turn, resulted in an overall increase in the market-to-book ratio. The increase in the market-to-book ratio was significant at the 10% level, whilst neither the earnings yield nor the PE ratio were significant at any of the three significance levels used in this study. All three market ratios for the population of technology companies showed a strong correlation in their ranking, both before and after applying the constructive capitalisation model. This can be demonstrated by the correlation coefficient of 1 for the earnings yield and the market-to-book ratio, whilst the PE ratio had a correlation coefficient of 0.983.

Table 6. The Impact on Market Ratios of JSE Listed Telecommunication Companies when Operating Leases are Constructively Capitalised

Financial performance ratios	Pre-capitalisation mean	Post-capitalisation mean	Mean absolute change	Mean relative change	P-Value (T-test)	Spearman's rank correlation coefficient
Earnings yield	5.55%	5.87%	0.32%	20.42%	0.481	1
Price earnings	150.81	144.07	-6.74	-11.00%	0.368	1
Market to book ratio	10.62	10.71	0.09	3.58%	0.333	1

5.3.2. Telecommunication Companies

Once the constructive capitalisation model had been applied to the telecommunication companies it was revealed that the mean post-earnings yield ratio showed an absolute increase of 0.32% whereas the mean relative increase was 20.42%. However, the PE ratio experienced an opposite change, which is demonstrated by the mean absolute decrease of 6.74 and mean relative decrease of 11%, post-capitalisation. This is due to the mean earnings increasing after the operating leases had been capitalised, which, in turn, resulted in a mean increase in the earnings yield and a mean decrease in the PE ratio. The market-to-book ratio increased by a mean absolute 0.09 and a mean relative increase of 3.58% once the constructive capitalisation model had been applied. None of the changes mentioned previously were considered significant when compared to the three different significance levels. Although these changes in the market ratios were not considered significant, there was a strong positive relationship in the ranking of the ratios before the constructive capitalisation model had been applied, and subsequently as can be seen by the Spearman's ranking calculation of 1 for all three market ratios.

Despite the mean change in the earnings yield and PE ratio moving in opposite directions for the technology and telecommunications populations, both these movements were considered reasonable. The impact on profit is determined by the stage in the lease in which the company finds itself. At the beginning stages of the lease, the sum of the interest and amortisation is greater than the operating lease expense, which will result in the profit decreasing when the constructive capitalisation model is applied, while the opposite occurs in the later period of a lease. This explains the mean decrease in the earnings yield for the technology companies and the reason for the mean increase in the same ratio for the telecommunication companies. The changes in the market ratios from prior studies such as Fulbier *et al*. (2008) were marginal, which is consistent with the changes shown in Table 5 and Table 6. Further studies (Dillion, 2014) confirmed that the impact experienced on market ratios was mostly insignificant when operating leases are capitalised.

6. Conclusion and Limitations

The main finding of the study is that when the constructive capitalisation model is applied, it results in changes in the financial performance, financial position and market ratios for both the technology and telecommunication populations. Despite some of these changes being significant for the technology population, the changes for the telecommunication population were not considered significant.

6.1. Financial position

When the constructive capitalisation model was applied to the technology and telecommunication companies in the research, all the debt ratios increased, as expected. However, the mean relative increase in the debt ratios for the telecommunication companies was much greater than the increase in the debt ratios for the technology companies. This is assumed to be due to the JSE listed telecommunication companies making use of more material operating leases than the JSE listed technology companies. The changes that resulted in the debt ratios were considered significant when compared to the three significance levels used for the JSE listed technology companies. In contrast, the increases in the debt ratios were not shown to be significant for the JSE listed telecommunication companies when assessed against the various significance levels. All the financial position ratios for both the technology and telecommunication populations experienced a strong correlation before and after the capitalisation of operating leases.

6.2. Financial Performance

The EBIT and EBITDA ratios revealed a mean absolute and relative increase for the populations of both the technology and the telecommunication companies. In contrast, the net profit after tax (NPAT) ratio reflected a mean marginal decrease for the population of technology companies, whilst the NPAT ratio for the sample of telecommunication ratios experienced a mean increase. This difference in direction of the mean change in the NPAT ratios for the technology and telecommunication populations can be attributed to the period that the leases fall within. The ROA, capital employed and ROE ratios all reflected a mean absolute and relative increase for the technology and telecommunication populations. In addition, the asset turnover ratio and times interest earned ratio both decreased for the populations of the technology and the telecommunication companies. The mean changes in the EBITDA, ROA, ROCE and asset turnover ratio for the population of technology companies were regarded as being significant when compared to the significance levels used in the study. None of the mean changes for the financial performance ratios were found to be significant for the JSE listed telecommunication companies. All the financial performance ratios, except the ROA, together with the ROCE, experienced a strong correlation between the ratios both before and after the capitalisation of operating leases.

6.3. Market Ratios

The earnings yield for the technology companies showed a mean relative decrease post-capitalisation, whilst the market-to-book ratio reflected a mean relative increase. In addition, the mean post-capitalisation earnings yield and market-to-book ratio both increased for the population of telecommunication companies. In addition, the PE ratio reflected a mean increase for the technology companies in the population; however, a mean decrease was observed in the PE ratio for the telecommunication companies post-capitalisation. The only market ratio that experienced a significant change was the market-to-book ratio for the technology companies. All the market ratios for both the technology and telecommunication populations experienced a strong correlation pre- and post-capitalisation.

7. Limitations

The study was only conducted on the technology and telecommunication industries of the JSE and, as all industries contained within the JSE have unique attributes, it was not possible to extrapolate the results from the two industries studied as applicable to all industries.

8. Further Research

As mentioned previously, leasing, especially using the constructive capitalisation model, is under - researched in South Africa. Consequently, the constructive capitalisation model could possibly be applied to other companies listed on the JSE operating in other industries that were not included in either this study or in Dillion's study in 2014.

9. Acknowledgements

This paper is part of a study that has been funded by the University of KwaZulu-Natal

Capacity Development Programme (UCDP).

References

Beattie, V., Edwards, K., & Goodacre, A. (1998). The impact of constructive operating lease capitalisation on key accounting ratios. *Accounting and Business Research*, 28(4), pp. 233-254.

Bennet, B. K., & Bradbury, M. E. (2003). Capitalizing non-cancelable operating Leases. *Journal of International Financial Management and Accounting*, 14(2), pp. 101-113.

Correia, C.; Flynn, D.; Uliana, E. & Wormald, M. (2015). *Financial Management.* 8th ed. Landsdowne: Juta.

Correia, C.; Flynn, D.; Uliana, E. & Wormald, M. (2011). *Financial Management.* 7th ed. Cape Town: Juta.

De Oliveira, S. (2016). *The new IFRS 16: A huge undertaking for the leasing industry.* https://www.les-experts-denjean-associes.com/the-new-ifrs-16-a-huge-undertaking-for-the-leasing-industry.

De Villiers, R. R. & Middleberg, S. L. (2013). Determining the impact of capitalising long-term operating leases on the financial ratios of the top 40 JSE-listed companies. *International Business & Economics Research Journal, 12*(6), pp. 655-669.

Dillion, J. (2014). *Impact of constructive capitalisation of operating leases on South African companies considering new proposed lease accounting rules.*Unpublished master's thesis. University of Cape Town, Cape Town, South Africa.

Durocher, S. (2008). Canadian evidence on the constructive capitalization model of operating leases. *Accounting Perspectives*, 7(3), pp. 227-256.

Duke, J. C. & Hsieh, S. J. (2006). Capturing the benefits of operating and synthetic leases. *Journal of Corporate Accounting & Finance*, 18(1), pp. 45-52.

Ernst & Young. (2016). *A summary of IFRS 16 and its effects.* Ernst & Young. https://www.ey.com/Publication/vwLUAssets/ey-leases-a-summary-of-ifrs-16/$FILE/ey-leases-a-summary-of-ifrs-16.

Fulbier, R. U.; Silva, J. L. & Pferdehirt, M. H. (2008). Impact of lease capitalisation on financial ratios of listed German companies. *Schmalenbach Business Review*, 60, pp. 122-144.

International Accounting Standards Board (IASB). (2016a). *IFRS 16: Leases.* In *International Financial Reporting Standards*. London: IFRS Foundation.

International Accounting Standards Board (IASB). (2016b). *IAS 37: Provisions, Contingent Liabilities and Contingent Assets. In International Financial Reporting Standards*. London IFRS Foundation.

International Accounting Standards Board (IASB). (2016c). *IFRS 16: Effects Analysis. In International Financial Reporting Standards.* London IFRS Foundation.

International Accounting Standards Board (IASB). (2013). *Basis for Conclusions Exposure Draft ED/2013/6 Leases*. London: IFRS Foundation.

International Accounting Standards Board (IASB). (2010). *IAS 17: Leases.* London: IFRS Foundation.

Imhoff, E. A., Lipe, R. C., & Wright, D. W. (1997). Operating lease: Income effects of constructive capitalisation. *Accounting Horizons*, 11(2), pp. 12-32.

Imhoff, E. A., Lipe, R. C. & Wright, D. W. (1991). Operating leases: Impact of constructive capitalisation. *Accounting Horizons*, 5(1), pp. 51-63.

Jesswein, K. R. (2009). Analysing creditworthiness from financial statements in the presence of operating leases. *Academy of Accounting and Financial Studies Journal*, 13(1), pp. 75-90.

Koppeschaar, Z. R., Rossouw, J., Sturdy, J., Van Wyk, H. A., Gaie-Booysen, F.F., Papageorgiou, K., Smith, C., Van der Merwe, C.M., & Schmulian, A. (2016). *Descriptive Accounting.* 20th ed. Durban: LexisNexis.

PricewaterhouseCoopers (PwC). (2018). *CFO's guide: Which sectors and groups will be most impacted by IFRS 16 in the Middle East*. Available at: https://www.pwc.com/m1/en/media-centre/articles/cfo-guide-which-sectors-and-groups-will-be-most-impacted-by-ifrs-16.html. Accessed: 20 September 2018.

PricewaterhouseCoopers (PwC). (2016). *In the spotlight an industry focus on the impact of IFRS 16 - Communications*. Available at http://blog.innervision.co.uk/blog/industry-focus-assessing-the-impact-of-ifrs-16-on-the-telecommunications-industry. Accessed: 15 September 2018.

Securities and Exchange Commission (SEC). (2005). *Report and Recommendations Pursuant to Section 401(c) of the Sarbanes-Oxley Act of 2002 On Arrangements with Off-Balance Sheet Implications, Special Purpose Entities, and Transparency of Filings by the Issuers,* s.I.: United States Securities and Exchange Commission.

Service, C. (2018). *Gripping Gaap.* 19th ed. Durban: LexisNexis.

Sharenet. (2018). *Top 100 companies by market capital.* http://www.sharenet.co.za/index.phtml?content=/free/topco.phtml.

Stainbank, L.; Oakes, D. & Razak, M., (2012). *A Student's Guide to International Financial Reporting.* 8th ed. Eston: S&O Publishers.

Stainbank,L.; Oakes,D. & Razak, M., (2016). *A Student's Guide to International Financial Reporting.* 10th ed. Eston: Novus Holdings.

Tai, B. Y. (2013). Constructive capitalization of operating leases in the Hong Kong fast-food industry. *International Journal of Accounting and Financial Reporting*, 3(1), pp. 128-142.

White, E. (2016). *Global leasing report,* s.l.: White Clarke Group.